IN THE SPECIFICATION

Please change the title to:

"DIFFERENTIAL GMR SENSOR WITH MULTI-LAYER BIAS STRUCTURE BETWEEN FRE LAYERS OF FIRST AND SECOND SELF-PINNED GMR SENSORS"

Replace the paragraph beginning at page 22, line 20 with the following replacement paragraph.

The net moment of the in-stack exchange bias structure 830 is chosen to be zero. The Ni content of the ferromagnetic layers 882, 883, 884, 885 is preferably greater than 90%. The stress induced magnetic anisotropy of the ferromagnetic layers 882, 883, 884, 885 achieves pinning parallel to the air ~~bear~~ bearing surface. The in-stack exchange bias structure 830 provides antiparallel magnetizations of the free layers 844, 846 through exchange coupling. The thickness of the in-stack exchange bias structure 830 can be tailored by selecting an even number of ferromagnetic layers 882, 883, 884, 885. Removal of antiferromagnet (AFM) from the in-stack exchange bias structure 830 removes unwanted series resistance as well as makes setting of the ferromagnetic layers 882, 883, 884, 885 easier. The thicknesses of the spacer layers 888/886 should be selected to provide the desired bias.

Replace the paragraph beginning at page 24, line 6 with the following replacement paragraph.

In Fig. 10, a first shield and gap layer are formed. A first GMR sensor is formed 1010. The first GMR sensor includes a pinned layer implemented using three ferromagnetic layers 1020 to provide 180° magnetization phase between the pinned layers that are next to the spacer layers. The first GMR sensor also includes a spacer layer and a free layer 1030. The free layer includes a first free layer an interlayer and a second free layer. A gap layer is formed over the first GMR sensor 1040. The gap layer provides an in-stack exchange bias structure that provides antiparallel magnetizations for the free layers without using antiferromagnetic layer. The gap layer may include four ferromagnetic layers such as NiFe separated by an interlayer such as Ru. The gap layer may alternatively includes a layer have a structure of $Ta/Al_2O_3/NiFeCr/CuO_x$. A second GMR sensor is formed over the gap layer. The second GMR sensor includes a pinned layer implemented using three ferromagnetic layers 1050 to provide 180° magnetization phase between the pinned layers that are next to the spacer layers. The second GMR sensor also includes a spacer layer and a free layer 1060. The free layer includes a first free layer, an interlayer and a second free layer.